

To the editors of the World Journal of Radiology,

Thank you for your review of our manuscript and the opportunity to revise our paper on 'Segmentation of carotid arterial walls using neural networks.' The opinions and suggestions offered by the reviewers have been helpful, and we appreciate your comments on revising both the form and content of the paper. In this letter, we will address the reviewers' concerns and make modifications to the manuscript when necessary.

Reviewer #1's comments:

*This paper is well written and organized. It has a novelty. I recommend its publication in this journal. However, this paper is too specialized. I have to acknowledge that I am not skilled at computer science nor familiar with imaging diagnosis of carotid diseases and CNN techniques. More skilled experts should be necessary to evaluate its scientific value. From general comments, the golden diagnostic criteria should be clearly proposed. As for an expert readers, is there any possibility of missing or wrong diagnosis? Additionally, the patients' characteristics should be briefly introduced.*

We are pleased that this reviewer has recommended the manuscript for publication. The reviewer's concern with a "golden diagnostic criteria" is well founded in any study but is especially important in a study where such criteria are subjective. In all studies of this type, the de facto gold standard for determining efficacy has been segmentation by expert researchers. The answer to the reviewer's question as to whether using this criteria could lead to "any possibility of missing or wrong diagnosis" is a resounding "Yes!". While such a possibility exists, the manual segmentation "gold standard" is simply the best we have for evaluating imaging data in isolation. One could consider incorporating non-imaging objective metrics into the criterion but this was not performed in this study. Finally, we have addressed the reviewer's request for additional patient characteristics with modifications to the manuscript.

Changes to manuscript:

Extra information was added to the methods section that added detail to the patient population characteristics including more specifics of patient disease.

Reviewer #2's comments:

*Authors applied CNN technique to the task of segmenting carotid arteries with MRI imaging. This technique was superior and might be useful. The results by CNN technique was well correlated with those with expert radiologists. However the association with pathology was unclear from the data shown in this manuscript. In Fig.2 and 3, the difference between CNN and wall area was found than others. Authors should explain or discuss it. Clinical significance should be discussed more detail (e.g. cost, time, difference with other modalities such as US or CT)*

We thank the reviewer for his comments on the utility of the CNN method. While the reviewer notes the good correlation between the CNN method and the manual approach in general, he has some specific concerns with the “wall area” metric. While we concur that the correlation is not perfect, we believe it to be within an acceptable range. It should be noted that using wall area as a metric is not optimal in that it may not convey morphological differences between the two segmentations. However, this problem is addressed in the manuscript by inclusion of the DICE measure that is a direct measure of overlap between two segmentations. Despite this deficiency, we included the wall area metric to facilitate comparisons with previous studies.

Additionally, the reviewer brings up some potential practical consequences of implementation of the technique such as savings in both cost and time. Although we concur with the reviewer, we submit that a quantitative evaluation of these savings is beyond the scope of this paper. Similarly, the reviewer's curiosity of how the method would compare with other imaging modalities is beyond the scope of the manuscript. We should note however that the CNN method is agnostic to the image acquisition technology but one could argue that the method might benefit from the inclusion of such information in future work.

Changes to manuscript:

Additions were made to the discussion section outlining the potential weakness of the area metrics and the ancillary benefits of including the DICE measure.

We hope the revised manuscript will better suit the World Journal Of Radiology but will consider further revisions. We thank you for your continued interest in our research.

Sincerely,

Daniel Samber